Instruction Manual:
E58 Self-Contained Thru-Beam 18mm Tubular Sensors

Models covered in this manual:			
Sensor Type	**Mode**	**AC/DC Models**	**DC-only Models**
Emitters		E58CAL18A2E2	E58CAL18T110E2
Receivers	Light Sense (N.C.)	E58CBL18A2C2	E58CBL18T110C2 (NPN)
		--	E58CBL18T111C2 (PNP)
	Dark Sense (N.O.)	E58CAL18A2C2	E58CAL18T110C2 (NPN)
		--	E58CAL18T111C2 (PNP)

WARNING

THESE PRODUCTS ARE NOT DESIGNED, TESTED, OR RECOMMENDED FOR USE IN HUMAN SAFETY APPLICATIONS.

USE #4 MOUNTING HARDWARE ONLY! LARGER HARDWARE WILL DAMAGE THE SENSOR AND MAY CREATE AN ELECTRIC SHOCK HAZARD. TIGHTEN THE HARDWARE JUST TO THE SENSOR BODY SO NO DEFLECTION OF THE BODY OCCURS.

DURING INSTALLATION, CORRECT POWER CONNECTIONS MUST BE MADE FIRST TO ENSURE FAIL-SAFE SHORT CIRCUIT PROTECTION OF THE OUTPUTS. REFER TO THE WIRING DIAGRAMS IN THIS MANUAL.

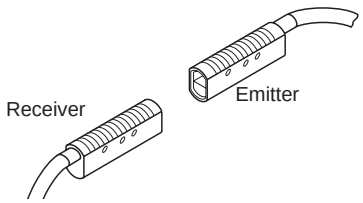
DO NOT USE TOOLS TO APPLY TORQUE DIRECTLY TO SENSOR BODY. ALIGN SENSOR BY HAND BEFORE TIGHTENING MOUNTING HARDWARE.

THE GAIN ADJUSTMENT POT IS A 3/4 TURN POT. ANY RESISTANCE ENCOUNTERED WHILE ADJUSTING THIS POT INDICATES YOU HAVE REACHED THE ADJUSTMENT LIMIT STOP. TURNING PAST THIS STOP WILL DAMAGE THE SENSOR.

USE ONLY A SUITABLE ADJUSTMENT TOOL OR FLAT BLADE SCREWDRIVER WHEN TURNING THE ADJUSTMENT POT. SHARP OBJECTS CAN DAMAGE THE POT AND RESULT IN ELECTRIC SHOCK.

INTRODUCTION

An E58 thru-beam photoelectric sensor installation consists of an emitter and a receiver positioned on opposite sides of a detection zone. The emitter emits infrared and visible red light, which is detected by the receiver. The receiver output switches on when this beam of light is either blocked (when set in dark sense mode), or completed (light sense mode).

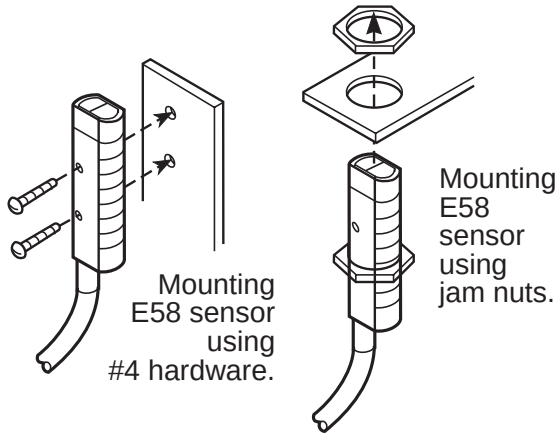


A complete system consists of an emitter and receiver mounted such that the emitter directs its light beam at the receiver and the receiver is aimed to detect the beam. The emitter and receiver can be separated by up to 26.5 meters (80 feet).

MOUNTING

The E58 sensor features a threaded housing and includes jam nuts and washers. This allows mounting into any 0.75 inch hole or any of the mounting brackets shown on page 4 of this manual. Use caution to avoid cross-threading the jam nuts on the sensor body. Tighten jam nuts to less than 4 Nm (36 in.-lbs. or 3 ft.-lbs.) torque to avoid stripping threads.

A second mounting method is to use #4 hardware in the 0.125 inch-diameter mounting holes in the flat sides of the sensor. This is ideal for mounting the E58 against a wall, piece of equipment, rail, mounting bracket, etc.



MOUNTING LOCATION AND SETUP

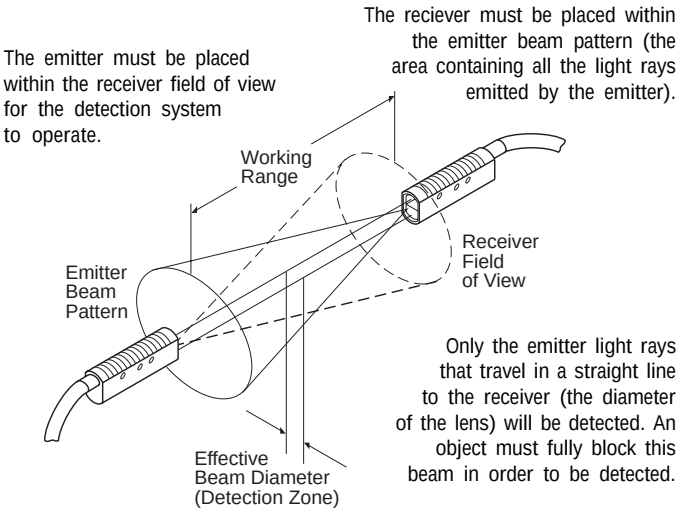
Mount the emitter and receiver units so they are aimed directly at each other from opposite sides of the target. (The receiver should be on the dirtier side because the light scattering effect of dirt collecting on the lens is less significant if it takes place at the receiver.) Ensure the area of the target to be detected will block the entire effective beam (see illustration on next page). Apply power to both units.

Accurate sensing depends on proper alignment of the emitter and receiver. To begin, the emitter and receiver must be positioned in rough alignment so that emitter light is received by the receiver (check by placing a solid object in front of the emitter beam—the output indicator on the receiver will change state when the object blocks the beam and change back when

the object is removed). If the output indicator does not change state, follow one or both of these two rough alignment methods:

1. The emitter emits visible red light. Look at the emitter with your eye positioned close to the reciever. Mount the receiver in the area where the emitter light is brightest.
2. Place a retroreflector over the lens of the receiver. Look at the reciever with your eye positioned close to the emitter. Mount the emitter in the area where the light reflected from the retroreflector is the brightest.

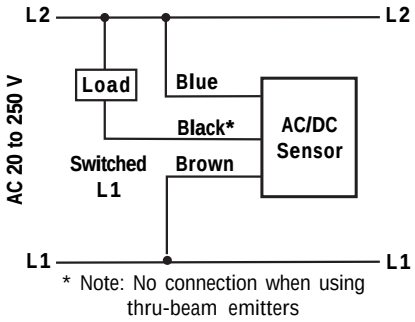
Obtain final alignment by moving the receiver back and forth in the horizontal axis to find the extreme positions where the output indicator on the receiver goes “OFF” (for dark operate models) or “ON” (for light operate models). Position the receiver midway between the two extremes. Repeat this procedure for the vertical axis, then tighten the receiver in place. Now repeat the final alignment procedure for the emitter.


The emitter must be placed within the receiver field of view for the detection system to operate.
The reciever must be placed within the emitter beam pattern (the area containing all the light rays emitted by the emitter).
Working Range
Receiver Field of View
Emitter Beam Pattern
Only the emitter light rays that travel in a straight line to the receiver (the diameter of the lens) will be detected. An object must fully block this beam in order to be detected.
Effective Beam Diameter (Detection Zone)

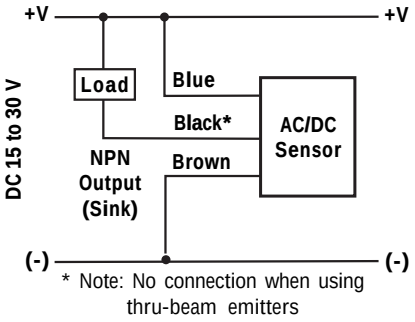
WIRING DIAGRAMS

For wiring cable versions, the color codes shown are the actual wire colors emanating from the sensor.

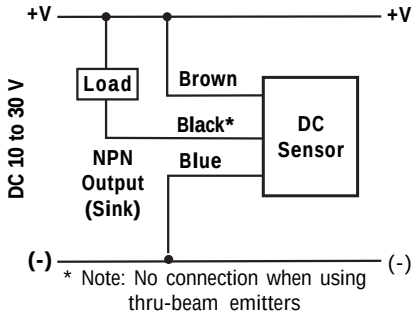
AC/DC Models (AC Connection)



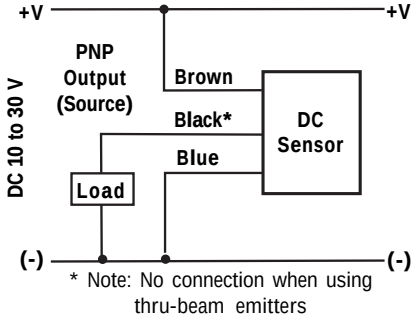
AC/DC Models (DC Connection, see Warning above)



DC Models (NPN Output)



DC Models (PNP Output)

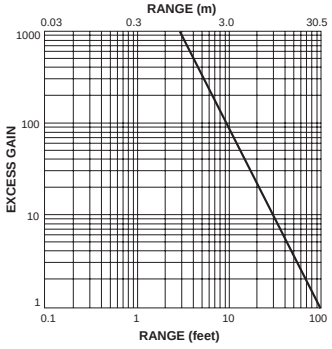


SPECIFICATIONS

	AC/DC MODELS (AC Operation)	AC/DC MODELS (DC Operation)	DC-ONLY MODELS
Input Voltage	20 to 264 V AC, 50/60 Hz	15 to 30 V DC (15 to 24 V DC above 55° C/131° F)	10 to 30 V DC (10 to 24 V DC above 55°C/131° F)
Power Dissipation	1.5 W maximum	1.5 W maximum	1 W maximum
Output Type	VMOS (bi-directional)	NPN (sink)	NPN or PNP
Current Switching Capacity	300 mA maximum	300 mA maximum	PNP (source): 100 mA maximum; NPN (sink): 250 mA max. (120 mA max. above 55° C/131° F)
Voltage Switching Capacity	375 V peak maximum	375 V peak maximum	30 VDC maximum
Off-State Leakage	250 µA typical; 500 µA maximum	250 µA typical; 500 µA maximum	10 µA maximum
Surge Current	2 A maximum	2 A maximum	1 A maximum
On-State Voltage Drop	- - -	1.8 V at 10 mA; 3.5 V at 300 mA	NPN: 400 mV at 10 mA, 1.5 V at 250 mA; PNP: 2.8 V at 100 mA
Response Time	8 mS		3.5 mS
Short Circuit Protection	Sensor will turn off immediately when a short or overload is detected (Indicator LED will flash). Turn power OFF and back ON to reset. **IMPORTANT**: During installation, correct power connections must be made first to ensure fail-safe short circuit protection of the outputs.		
Light/Dark Operation	By receiver model		
Temperature Range	Operating and Storage: -40° to +70° C (-40° to +158° F); Thru-beam Emitter: -4° to 158°F (-20° to 70°C)		
Material of Construction	Lens: Polycarbonate; Cable jacket: PVC; Body: Structural polyurethane foam (do not expose to concentrated acids, alcohols, or ketones)		
Cable/Connector	3-meter cable, 3-wire		
Vibration and Shock	Vibration: 30 g over 10 Hz to 2 kHz; Shock: 100 g for 3 mS 1/2 sinewave pulse		
Indicator LED	Emitter: Lights when powered in ON; Receiver: Lights steady when output is ON; Flashes when short circuit protection is in latch condition		
Sunlight Immunity	10,000 foot-candles		
Enclosure Ratings	NEMA 1, 2, 3, 4, 4X, 6, 12, and 13 Our products conform to NEMA tests as indicated, however, some severe washdown applications can exceed these NEMA test specifications. If you have questions about a specific application, contact our Applications Department.		
Approvals	UL recognized, CSA approved, CE compliant		

OPTICAL PERFORMANCE

All optical specifications are guaranteed to be the minimum performance under clean conditions of any product delivered from stock. Typical performance may be higher.

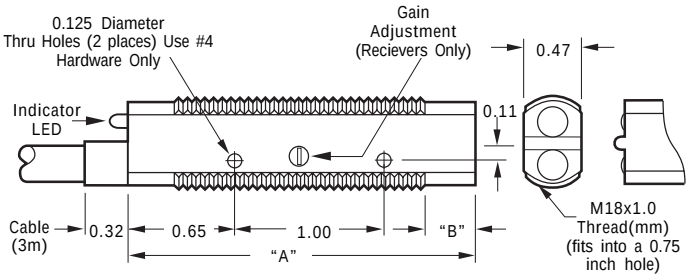


Dirt in the environment will affect optical performance by reducing the amount of light the control receives. For best results, sensors should be used at distances where excess gain is higher than 1.5 (1.5 times the amount of sensing power required to detect an object under ideal conditions). Higher excess gain will allow the sensor to overcome higher levels of contamination on the lens. All ranges and excess gain graphs are based on a 90% reflectance white card.

Source	Sensing: Infrared, 880 nm Alignment: Visible red, 660 nm
Maximum Range	80 feet
Optimum Range	0 to 40 feet
Field of View	40 inch diameter at 40 feet
Effective Beam	0.25 x 0.625 inches

APPROXIMATE DIMENSIONS

(Shown in inches except where noted)



Sensor Type	A	B
Emitters	2.75	1.10
Receivers	2.60	0.25

MOUNTING BRACKETS

Mounting Bracket	Allows a minimum adjustment range. Sensor mounts with two jam nuts (included with sensor).	**E57KM18**
L-Shaped Bracket	Two per package. Allows a minimum adjustment range. Sensor mounts with two jam nuts (included with sensor). Chromate finish aluminum	**6161A-6501**
L-Shaped Bracket with Slot Bulk	Two per package (order quantity will be sent bulk packed). Allows installation of sensor with jam nuts in place on sensor body.	**6161AS7050**
Flat Bracket	Allows a minimum adjustment range. Sensor mounts with two jam nuts and washers (included with sensor). Chromate finish aluminum	**6161AS5295**
Flush Mount Bracket	Contoured design with no alignment adjustment. Sensor mounts with #4 studs. 304 stainless steel	**616AS5296**
Flush Mount Bracket	Same as above except with contour. 304 stainless steel	**616AS5297**
Adjustable Bracket	Locking vertical and horizontal adjustments for independent adjustments in each axis. Sensors is electrically insolated from mounting surface. Sensor mounts with two jam nuts and washers (included with sensor). 304 stainless steel	**E58KAM18**
Ball Swivel Bracket	Allows 360 degree rotation and 10 degree vertical tilt. Made from Noryl® .	**6181AS5200**
18mm Ball Swivel Bracket	Allows 360 degree rotation and 10 degree vertical tilt. Suitable for use with any 18mm threaded sensor. Made from 5% glass filled Valox®.	**E58KAM18B**

Still Need Help?

Contact the Cutler-Hammer Sensor Application Engineers

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